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OCCURRENCE OF *CULEX (BARRAUDIUS) INATOMII* KAMIMURA AND WADA (DIPTERA: CULICIDAE) IN A LARGE MARSH ADJACENT TO THE COAST OF ULSAN, KOREA

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ABSTRACT. The occurrence of *Culex (Barraudius) inatomii* Kamimura and Wada was observed from a large, reedy marsh with fairly polluted brackish water near the coast of Ulsan, Korea, at an industrial complex. On average, 263.6 larvae per dip (450-cc dipper) were collected, and 408 females were caught by human biting collection in an hour. A CDC light trap set up outdoors collected 511 *Cx. inatomii* (96.8% of the total mosquitoes). The occurrence of this rarely reported mosquito raises questions about the effects of habitat modification and the need for further study.

KEY WORDS *Culex inatomii,* occurrence, Korea

The Ulsan industrial complex, located on the east coast of the Korean peninsula, has been continuously expanded since the 1970s. In the middle of the complex, a large marsh (26 ha) was created about 10 years ago. The marsh is heavily covered with reeds. Industrial and family waste waters partially flow into the brackish water of the marsh. Inhabitants of 2 villages (total population of 356), Ochon-maul and Odae-maul of Yongam-ri, Chongryang-myon, Ulsan-si, adjacent to the marsh, have complained of severe mosquito bites for several years. Therefore, a mosquito survey was carried out at Ochon-maul and the marsh on August 3–4, 1997, and the principal mosquito was found to be *Culex inatomii* Kamimura and Wada, the rarely reported species.

Larval collection was made by dipping with a 450-cc dipper. Three dips were made at each of 3 randomly selected sites of the marsh (Table 1). A total 2,415 larvae were collected by 9 dips at the random sites. The number of larvae per dip was 268.3, consisting of 263.6 larvae of *Cx. inatomii,* 2.9 larvae of *Culex tritaeniorhynchus* Dyar, and 1.9 larvae of *Aedes dorsalis* (Meigen). A CDC miniature black light trap was set up under the eave of a storehouse in Ochon-maul and operated throughout the night (2100–0600 h) on August 3–4, 1997. As shown in Table 2, 528 mosquitoes were collected, of which the majority (511) were *Cx. inatomii* (96.8%). The others were *Cx. tritaeniorhynchus* (0.6%), *Culex pipiens pallens* Coquillett (0.4%), *Anopheles sinensis* Wiedemann (0.9%), and *Ae. dorsalis* (1.3%). A human biting collection was carried out outdoors, approximately 10 m away from the breeding place (the marsh), for an hour from 2200 to 2300 h. Only 2 species were collected, 408 females of *Cx. inatomii* and 3 females of *An. sinensis.* There was only 1 cow stocked in the village. Mosquitoes were also collected while resting on the wall of the cow shed during daytime with the use of a torch and an aspirator. All mosquitoes aspirated were killed in a chloroform tube and identified under a stereoscopic microscope. Out of 71 mosquitoes collected, 80.3% were *Cx. inatomii* (57 females), and the rest were *An. sinensis* (12.7%), *Cx. pipiens pallens* (2.8%), and *Ae. dorsalis* (4.2%).

Culex (Barraudius) inatomii was described by Kamimura and Wada (1974) as a new subspecies of *Culex modestus* Ficalbi and later elevated to species status by Tanaka et al. (1979). This species was

Table 1. Larval collection in the marsh by dipping (450-cc dipper) in August 1997.

Site	No. dips	No. larvae: *Culex inatomii*	*Culex tritae*	*Aedes dorsalis*	Total
Site A	3	947	23	0	970
Site B	3	49	0	17	66
Site C	3	1,376	3	0	1,379
Total	9	2,372	26	17	2,415
No. per dip	—	263.6	2.9	1.9	268.3
%	—	98.2	1.1	0.7	100

Table 2. CDC black light trap collection installed under the eave of a storehouse at Ocheon village near the marsh in August 1997.

Species	No. mosquitoes/trap/night: Female	Male	Total	%
Culex inatomii	496	15	511	96.8
Culex tritaeniorhynchus	3	0	3	0.6
Culex pipiens pallens	1	1	2	0.4
Anopheles sinensis	5	0	5	0.9
Aedes dorsalis	2	5	7	1.3
Total	507	21	528	100

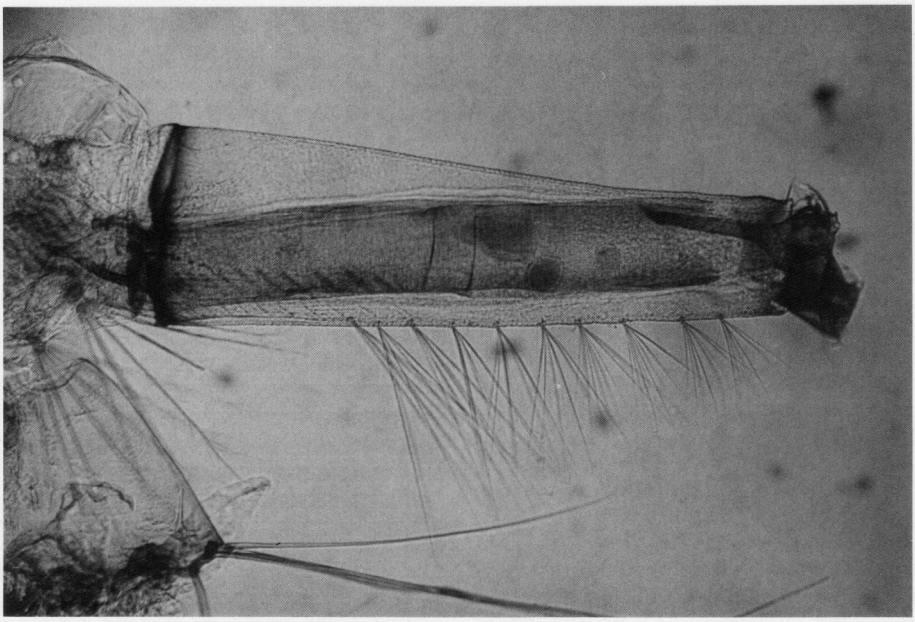

Fig. 1. The siphon of *Culex inatomii* larva, showing 10 ventral siphon hairs (1-S).

recorded at only 2 localities, 1 in Japan and the other in Korea. In Japan, this species was found at Utoma, Kurashiki City, Okayama Prefecture, Western Honshu, where the larvae occurred in pools of brackish water in a reedy field near the coast. In Korea, Lee and Lee (1975) reported that 5 larvae of this species were collected in a water pool in Seoul. Ecological and epidemiological aspects of this species are unknown. All the morphological key characters of the larvae and adults (both females and males) of Korean *Cx. inatomii* reported here are identical to those of Japanese *Cx. inatomii* described by both Kamimura and Wada (1974) and Tanaka et al. (1979) except the siphon hairs (seta 1-S) of the larva. Tanaka et al. (1979) described seta 1-S with 8–11 ventral, usually fairly evenly spaced setae, the basalmost 1-S 6–12-branched, the others usually with more than 10 branches. As shown in Fig. 1, Korean *Cx. inatomii* had seta 1-S with 8–11 (8, 10%; 9, 25%; 10, 50%; 11, 15%) ventral, mostly fairly evenly spaced, basalmost 1-S 5–9 branched, the others usually with mostly 7–10 ($\bar{x}$ = 8) branches (72.4%). This may indicate that the Korean populations have fewer siphon hair branches (1-S) than the Japanese populations.

Reclaimed lands have been continuously expanding along the coast of the Korean peninsula and on many islands, creating ideal breeding places for *Cx. inatomii* on a large scale, as observed at Ulsan industrial complex. As a consequence, outbreaks of this rarely reported mosquito may raise a serious public health menace to inhabitants. Further studies should be carried out to determine the ecological and possible epidemiological impacts of the occurrence of *Cx. inatomii* along the Ulsan Coast and to find effective control measures.

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